

CFEC FY07 Region I Increment Spending Summary

by

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Alaska Department of Fish and Game

Division of Commercial Fisheries



Symbols and Abbreviations

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Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Administrative		fork length	FL
deciliter	dL	Code	AAC	mid-eye-to-fork	MEF
gram	g	all commonly accepted		mid-eye-to-tail-fork	METF
hectare	ha	abbreviations	e.g., Mr., Mrs., AM, PM, etc.	standard length	SL
kilogram	kg			total length	TL
kilometer	km	all commonly accepted			
liter	L	professional titles	e.g., Dr., Ph.D., R.N., etc.	Mathematics, statistics	
meter	m			<i>all standard mathematical</i>	
milliliter	mL	at	@	<i>signs, symbols and</i>	
millimeter	mm	compass directions:		<i>abbreviations</i>	
		east	E	alternate hypothesis	H _A
Weights and measures (English)		north	N	base of natural logarithm	<i>e</i>
cubic feet per second	ft ³ /s	south	S	catch per unit effort	CPUE
foot	ft	west	W	coefficient of variation	CV
gallon	gal	copyright	©	common test statistics	(F, t, χ^2 , etc.)
inch	in	corporate suffixes:		confidence interval	CI
mile	mi	Company	Co.	correlation coefficient	
nautical mile	nmi	Corporation	Corp.	(multiple)	R
ounce	oz	Incorporated	Inc.	correlation coefficient	
pound	lb	Limited	Ltd.	(simple)	r
quart	qt	District of Columbia	D.C.	covariance	cov
yard	yd	et alii (and others)	et al.	degree (angular)	°
		et cetera (and so forth)	etc.	degrees of freedom	df
Time and temperature		exempli gratia		expected value	<i>E</i>
day	d	(for example)	e.g.	greater than	>
degrees Celsius	°C	Federal Information		greater than or equal to	≥
degrees Fahrenheit	°F	Code	FIC	harvest per unit effort	HPUE
degrees kelvin	K	id est (that is)	i.e.	less than	<
hour	h	latitude or longitude	lat. or long.	less than or equal to	≤
minute	min	monetary symbols		logarithm (natural)	ln
second	s	(U.S.)	\$, ¢	logarithm (base 10)	log
		months (tables and		logarithm (specify base)	log ₂ , etc.
Physics and chemistry		figures): first three		minute (angular)	'
all atomic symbols		letters	Jan,...,Dec	not significant	NS
alternating current	AC	registered trademark	®	null hypothesis	H ₀
ampere	A	trademark	™	percent	%
calorie	cal	United States		probability	P
direct current	DC	(adjective)	U.S.	probability of a type I error	
hertz	Hz	United States of		(rejection of the null	
horsepower	hp	America (noun)	USA	hypothesis when true)	α
hydrogen ion activity	pH	U.S.C.	United States	probability of a type II error	
(negative log of)			Code	(acceptance of the null	
parts per million	ppm	U.S. state	use two-letter	hypothesis when false)	β
parts per thousand	ppt, ‰		abbreviations	second (angular)	"
			(e.g., AK, WA)	standard deviation	SD
volts	V			standard error	SE
watts	W			variance	
				population	Var
				sample	var

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CFEC FY07 REGION I INCREMENT SPENDING SUMMARY

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ABSTRACT

The 2006 Alaska Legislature appropriated a \$150,000 increment of Commercial Fishery Entry Commission fines and forfeitures receipts to the Alaska Department of Fish and Game Commercial Fisheries Division-Region I, as a supplement to the 2007 fiscal year appropriation. The additional funding was requested primarily by members of the Southeast Alaska commercial shellfish industry and earmarked by the department for three distinct projects: golden king crab on-board observer program, pot shrimp stock assessment, and assistance to the region's biometrics unit. The biometrics support project included finalizing and documenting an existing red king crab stock assessment survey restratification project. Although shellfish projects were the impetus for the funding, two additional biometric support projects were included: herring model refinement, and sablefish stock assessment program review. This report summarizes the projects that were completed as a result of the additional funding and includes a detailed breakdown of how funding was used.

Key words: CFEC increment, Golden king crab, pot shrimp, Southeast Alaska, sablefish, herring, stock assessment, model

PROJECT NEED AND OVERVIEW

GOLDEN KING CRAB

Golden king crabs, *Lithodes aequispinus*, are taken from the deeper waters, between 100 and 350 fathoms, of northern Southeast Alaska. Few golden king crabs are harvested from the southern portion of Southeast Alaska. Important golden king crab fishing grounds are located at the confluence of Icy Strait, Lynn Canal, and Chatham Strait; where Chatham Strait and the western portion of Frederick Sound meet; and where Stephens Passage and Frederick Sound meet (Figure 1). Golden king crab fishing conditions are more demanding than for red king crab, *Paralithodes camtschaticus*, or Tanner crab, *Chionoecetes bairdi* because of the difficulties associated with grounds more exposed to adverse weather conditions, greater depths, strong tidal exchanges, and heavy currents.

Commercial vessels participating in the golden king crab fishery are primarily salmon tenders, salmon purse seine vessels, and a few large drift gillnet boats. Fishing gear has gradually evolved to include side-loading king crab pots (7-foot x 7-foot x 30-inch) and top loading conical or pyramid-style pots. Because of challenging fishing conditions fishers prefer heavier gear, and use different line and buoy train set-ups. Soak times are generally longer compared to red king or Tanner crab fishing.

There is no fishery-independent stock assessment program for golden king crab in Southeast Alaska and management is based in part on life history information from other regions. Guideline harvest levels, within the regulatory guideline harvest range, are determined and targeted inseason by managers based on stock status. Stock status is determined by a triennial evaluation of fishery (fish ticket and logbook) and sampling information. Sampling is conducted dockside and by onboard observers. Dockside sampling provides information on the size composition of the legal catch only; onboard observing can provide a suite of additional information. The objectives of onboard observing are:

- Describe the size and sex composition of golden king crab captured in a legal crab pot.
- Describe the size and sex composition of golden king crab captured in a crab pot with the escape rings closed.
- Describe the bycatch species composition.

- Describe fishing methods common in the fishery including bait, gear, and soak times.
- Describe the distribution of commercial grounds within each management area.
- Describe ontogenetic depth distribution of golden king crab in Southeast Alaska. Describe any periodicity in golden king crab life history.
- Obtain data on chela height allometry to define area-specific size at maturity.

Prior to the 2006/07 season, onboard observing during the commercial golden king crab fishery was conducted only sporadically and was dependent upon limited funding, limited staff time to coordinate the program, the availability of shellfish staff to participate, and volunteer vessels. From 1997/98–2003/04 seasons, a mean of 42 pot pulls were observed and 362 golden king crab measured in each area annually; a grand total of 2,059 pot pulls were observed and 17,740 crabs measured over this same period (**Error! Reference source not found.**). The golden king crab onboard observer program was discontinued in the 2004/05 season in response to the loss of a Fisheries Biologist II position by the Region I shellfish program, and no observer trips were conducted for two seasons (**Error! Reference source not found.**).

POT SHRIMP

The pot shrimp fishery in Southeastern Alaska is currently the only viable commercial pot fishery for shrimp in the state. Spot shrimp, *Pandalus platyceros*, comprise the majority of the landed weight; the remainder is primarily coonstripe shrimp, *P. hypsinotus*. Since 1960, the fishery has undergone a 10-fold increase in the number of participating vessels. This caused concern for conservation of shrimp stocks, which led to increasing restrictions, including limited entry in 1996. Vessel configuration is a function of market demand and has evolved from smaller vessels with a limited fresh local market to larger catcher-processors, which sell frozen whole shrimp, primarily to the Japanese market. The season has shortened from year-round in 1981 to the current season, which by regulation begins on October 1, and ends February 28 or once target guideline harvest levels (GHLs) have been achieved. Historically, GHLs were determined based on past fishery performance, however there may only be a weak relationship between historical harvest and the sustainability of current harvest levels, particularly under changing environmental and ecological conditions.

Spot and coonstripe shrimp are protandric hermaphrodites, changing into females, as they grow larger (Butler 1970). Since the harvest is primarily of larger shrimp, removal of an excessive proportion of these females could affect the reproductive potential of the stocks. Long-term effects on recruitment and stock strength due to this harvest approach are not known. Spot shrimp may be fairly long-lived and sedentary within suitable habitat. In addition, the patchy spatial structure of spot shrimp habitat may result in aggregated populations that may be vulnerable to serial depletion. Consequently, a primary management goal for this fishery is preventing growth and recruitment overfishing.

In order to assess stock status, annual shrimp pot surveys are conducted prior to the commercial fishery in four districts of Southeast Alaska (**Error! Reference source not found.2**). This survey program was launched with a pilot survey conducted in District 6 in 1996, and then expanded to District 3 in 1997, District 13 in 1999, and District 12 in 2000. Survey information is used to make recommendations on preseason GHLs to achieve a sustainable harvest and to adjust regulatory GHRs when necessary. The objectives of the survey program are to provide a preseason index of abundance by size class, describe the size composition, monitor the size at

transition to female, and to obtain catch information by product type for comparison to the actual size composition of the unsorted, unprocessed survey catches.

BIOMETRIC SUPPORT

Funding requests for additional biometric support have been made by the region on numerous occasions (e.g. Hebert 2006). The intent of those requests has been to secure enough stable funding to hire permanent, full-time biometric staff to help support specialized statistical analyses and modeling that results in critical stock assessment advice for fisheries management staff. Of the \$150k CFEC FY07 increment, \$65k was allocated for biometric support within the region's Marine Fisheries Section. This amount of funding was not enough to adequately fund a full-time department position. Consequently, the allocation was used to fund several discrete, one-time contractual or collaborative projects with private consultants or university staff to help reduce pressure on department biometric staff by addressing questions that are important but for which little or no time exist to properly examine. Following are brief descriptions of these projects.

Red King Crab Restratification

Since 1978 the department has conducted a pot survey for red king crab (*Paralithodes camtschaticus*) in Southeast Alaska currently uses a catch-survey model to estimate mature and legal red king crab abundance. The survey design is based on random placement of pots within areas that are considered to contain red king crab habitat. After several years of survey data were collected, it was possible to revisit assumptions of whether areas were supporting red king crab and quantify the level of incidence observed within areas. In 2006, an analysis was performed that examined historical catch rates of red king crab in the department's survey, along with commercial catch, and bathymetry of survey areas, with the intent to improve the stock assessment survey and modeling. The result was that sub-strata were created within survey areas and survey design was restructured so that the number of survey pots placed among sub-strata were correlated to the variability of catch rates within strata. The change in survey design was expected to better focus survey effort in areas where less confidence existed, reduce the number of pots placed in areas of little or poor red king crab habitat, and produce an overall more precise estimate of red king crab abundance.

Since 2006, the department's survey and analysis have incorporated the newly implemented restratified survey design and it is considered by the department to have been successful in meeting the goal of improving the survey and producing a more precise estimate of abundance. A recent external review of the stock assessment program by a panel of experts in marine fish and crab populations also considered the restratification to be an improvement to the overall survey design (Quinn et al. 2006). Although the new survey design was completed and implemented, the analysis was not properly documented by the time the project leader retired from the department.

Herring Model Refinement

The department manages several commercial fisheries for Pacific herring (*Clupea harengus pallasii*) within Southeast Alaska, including fisheries for bait, sac roe, and spawn on kelp. Stock assessment surveys are completed for major stocks which include aerial surveys of milt distribution, dive surveys to quantify egg deposition, and collection of age, weight and length

samples. For stocks where adequate data time-series exist, age-structured assessment (ASA) modeling is conducted to estimate and forecast spawning biomass.

The department uses such an ASA model for managing the Sitka Sound herring stock, however the model does not include an estimate of variance or model comparison criteria such as Akaike information criterion (AIC) for comparing alternatively parameterized models. Nevertheless, including measures of estimate uncertainty, such as variance estimates, is crucial when providing fisheries managers with estimates of abundance which form the basis for exploitation.

The initial need was to obtain a model in a computer program that allows model variability to be estimated as quickly and easily as possible and can compare alternatively parameterized models. Once the program structure was developed, a second objective was to investigate whether increasing the flexibility of the model structure to incorporate temporal variation in maturity schedules (the proportion of fish-at-age that are mature, i.e. available to the fishery) or selectivity schedules (the proportion of fish-at-age that are selected by the gear) improve the model, based on the AIC selection criterion. A third objective was to investigate whether including an environmental covariate into the model improves the fit of the model. As disease has accounted for large mortality events in the Prince William Sound herring population and possible subsequent failure in recruitment, a fourth objective was to develop the model structure to accommodate future incorporation of disease data.

Sablefish Stock Assessment Program Review

The department manages two commercial sablefish (*Anoplopoma fimbria*) fisheries in Southeast Alaska, one in the Northern Southeast Inside Subdistrict (NSEI, aka Chatham Strait fishery), and one in the Southern Southeast Inside Subdistrict (SSEI, aka Clarence Strait fishery) (Figure 3). Although the department conducts stock assessment surveys in both areas, substantially more data is collected in the NSEI area, primarily due to a higher commercial value and economic importance of that fishery to the region. In Chatham Strait the department conducts an annual long line survey and an annual pot survey. Objectives of the long line survey are to collect samples to determine population age composition, weight and maturity at age, and provide a relative index of abundance. Samples are collected primarily to calculate an appropriate harvest rate, which is applied to an estimate of abundance to determine the equal quota share used to manage the fishery. The goal of the pot survey is to mark sablefish for later recapture in the commercial fishery. Data is used for estimating absolute abundance by comparing ratios of marked to unmarked fish. The abundance estimate is used to monitor the population level over time and is used as the basis for forecasting the population size for next year. In addition, tagging fish provides information about migration.

Over the past fifteen years several attempts have been made to model the Chatham Strait sablefish population using ASA models, however poor model fit or unrealistic results prevented their use for management of the fishery. As an alternative, the Chatham Strait mark-recapture project was initiated in 1997 to attempt estimates of abundance, which have been made with varying success since then. Estimates have been made using a Peterson estimator, which although is a simple equation becomes complicated by many assumptions that must be made about a population or methods, which cannot be easily tested. Because of some difficulty in interpreting mark-recapture results, and considering the high level of data that is currently and has in the past been collected for this population, the department decided that a review of all data and potential

estimator/model approaches was needed to determine the best direction to take to produce reasonably accurate and precise annual estimates of abundance and appropriate harvest rates with which to base management of this fishery. A similar program review was conducted in 2002 (see Carlile et al. 2002), however several years of data have been collected since then, warranting a fresh look at available options. Department biometric staff were not available to conduct the recent review due to heavy workload on higher priorities such as completing stock assessments needed for impending groundfish and herring fisheries; therefore help was sought outside of the department.

ACCOMPLISHMENTS

GOLDEN KING CRAB

Of the \$150k CFEC FY07 increment, \$60k was allocated to the Region I golden king crab project. As a result of this increment, the golden king crab observer program was reinstated for the 2006/07 season. Observer trips were conducted in 5 management areas: East Central, Icy Strait, Northern, Mid Chatham, and North Stephens Passage; trips were scheduled for Lower Chatham and Southern areas but not conducted due to no and low effort in these areas, respectively. A mean of 118 pot pulls per area were observed and 1,291 golden king crab per area measured, for a total of 828 pot pulls and 9,035 golden king crab in this single year (**Error! Reference source not found.**). This represents roughly a 3.6-fold increase in annual effort expended on this program as 17,740 crabs were measured previously in 7 years compared to 9,035 just for the 2006/07 season. In comparison with 2003/04 (the most recent year in which the observer program was conducted before being discontinued), it represents a 2.4-fold increase in effort as 3,780 crabs were measured in that year.

In order to reinstate and ensure sustainability of the observer program, a Fisheries Biologist I (PCN 11-1625) was hired to coordinate, participate in, and report on the program. The funding increment provides 8.5 months of salary for this 10-month seasonal position, or approximately \$42k. The remaining approximately \$18k is used to pay for travel and sea duty costs of observers participating in the program, sampling gear, satellite phone coverage, and per diem reimbursement to vessels while observers are aboard.

In addition to expanded observer coverage, the new Fisheries Biologist I position has allowed for increased attention to the safety of observers while in the field, and will also improve reporting, documentation, and database integrity of the program with completion of a golden king crab onboard observer methods report that is now in draft form. To maximize use of the new position, in addition to golden king crab onboard observer program duties, the Fisheries Biologist I also conducts logistics for and participates in red king, Tanner crab, and shrimp pot survey programs, and assists with red king crab survey analyses and reporting.

POT SHRIMP

Since the inception of the Region I shrimp pot survey program, funding has been piecemeal and inadequate to provide reliable, consistent data to support management decisions. In the past, surveys have been funded partially or completely by contracting with industry vessels to survey shrimp and recovering costs by selling shrimp captured during the survey. However, cost recovery shrimp surveys are often problematic for several reasons. First, fluctuations in both shrimp markets and stock levels make industry interest and prices bid for the survey work highly variable, reducing the chance of conducting surveys. Second, relying on industry vessels

focused on cost recovery may unintentionally lead to compromises in scientific credibility of surveys, or safety.

Of the \$150k CFEC FY07 increment, \$25k was allocated to the Region I pot shrimp stock assessment project. As a result surveys were planned and conducted in 2006 with more confidence, with considerably less uncertainty in contracting industry vessels, and with more assurance of consistency in methods and gear. A summary of funding sources and their magnitude is provided below (**Error! Reference source not found.**) and shows how the FY07 CFEC increment helped make up for the lack of stable funding and eased the annual scramble for funds to conduct these surveys. Additionally, the funding increment helped advance development of electronic sampling technology that is currently ongoing for crab port sampling and golden king crab onboard observer programs, but will be expanded into the shrimp pot survey program. This technology has helped produce prototypes of handheld electronic data input devices that will streamline data entry during surveys, reduce data entry errors, and free up time to allocate elsewhere within the program.

BIOMETRICS SUPPORT

The \$65k allocated for biometrics support was divided among projects roughly as follows: \$18.5k for red king crab restratification, \$13k for herring model refinement, and \$33k for sablefish stock assessment program review.

Red King Crab Restratification

The majority of work for most of this project was funded through NOAA Nearshore Marine Research Grant VI. Although objectives for the project were met, a comprehensive, scientific document was not completed because the project leader had retired from the department shortly afterward. Funding from the CFEC increment allowed contracting with the project leader to complete a final report to document the analysis in detail, which is in near final draft form, titled “Restrification of the Red King Crab Stock Assessment Survey in Southeast Alaska”, and authored by Dr. John E. Clark. Publication is anticipated in the department’s Fishery Data Series by early 2008.

Herring Model Refinement

During FY07 the department provided funding to the University of Alaska Fairbanks and collaborated with master’s degree candidate Mr. Peter Hulson, whose thesis focused on modeling Pacific herring populations in Prince William Sound and Sitka Sound. Through this collaboration, herring data from Sitka Sound along with model details and background information were provided by the department. In return, suggestions on ways to refine the Sitka Sound ASA model were provided, along with various other improvements such as a method and template for estimating variance, a Ricker model to fit the spawner-recruit relationship, a model that allows herring age at maturity to vary with time, a model that allows inclusion of environmental covariates (e.g. to account for variations in sea surface temperature), and a model that allows inclusion of disease data. The expectation is that because more elements are accounted for in the model it should improve accuracy or precision for estimates of spawning biomass and result in higher confidence in model results. Additionally, because the new model template uses software that does not require tedious annual technical updates, as is currently the case, modeling may become a more efficient process so that more time can be spent working on other important issues.

Much of the work that was conducted through this collaboration will be documented in Mr. Hulson's Master's Thesis, which is currently in draft form, and results are expected to be presented in a peer reviewed journal publication.

Sablefish Stock Assessment Program Review

Funding was used to contract with a private marine fisheries consultant during FY07 to review the region's NSEI sablefish stock assessment program and provide a suite of recommendations regarding what direction the program should take to achieve reasonably accurate, scientifically defensible estimates of abundance, harvest rate and other population parameters to manage the fishery. The consultant, Dr. Franz Mueter (Sigma Plus Statistical Consulting) has a high degree of expertise and experience reviewing groundfish stock assessment programs in the Gulf of Alaska and Bering Sea and sits on the North Pacific Fisheries Management Council's Scientific and Statistical Committee.

A presentation of preliminary findings and recommendations was given by Dr. Mueter in September 2007. The program review included an examination of data collected through department surveys, dockside sampling, and commercial fishery harvest. Although several options were considered to model the existing data, the focus became centered on ASA models and modifications of the currently used mark-recapture estimator. Age-structured assessment model exploration produced several preliminary notable observations, including: 1) the annual long line survey catch-per-unit-effort (CPUE) trends do not appear to be a good indicator of modeled abundance, 2) fishery CPUE does appear to track well with modeled biomass estimates, and 3) if ASA model is used, estimates of absolute abundance are necessary, but may not be required annually, as is done currently. Highlights of preliminary observations from exploration of mark-recapture estimators included: 1) a temporally stratified Peterson model with parameters for immigration and commercial CPUE may address the apparent decline in abundance estimates over duration of the fishery and 2) it is better to maintain consistent sampling design, even if somewhat flawed than to modify methods in an attempt to correct problems that have been identified.

A written report with detailed recommendations is expected to be finalized and delivered to the department by the end of 2007, along with software templates for ASA and other models.

FUNDING SPENDING SUMMARY

A line-item summary of allocations and spending plans for each project is presented for each project in Appendix A.

REFERENCES CITED

- Carlile, D.W., B. Richardson, M. Cartwright, and V.W. O'Connell. 2002. Southeast Alaska sablefish stock assessment activities 1988-2001. Alaska Dept. Fish and Game, Comm. Fish. Div., Reg. Inform. Rep. 1J02-02, Juneau, Alaska.
- Hebert, Kyle. 2006. A Program For Improving Management And Research Of Fisheries In The Southeast Region—Shellfish Fisheries. Alaska Department of Fish and Game, Regional Report Series No.1J06-14, Douglas, Alaska.
- Quinn II, T.J., T.C. Shirley, and T.M. Koeneman. 2006. Southeastern Alaska red king crab stock assessment review. Alaska Department of Fish and Game, Special Publication No. 06-12, Anchorage.

Table 1.—Summary of effort distribution in the Southeast Alaska golden king crab commercial fishery onboard observer program during 1997-97 through 2006-07 seasons.

Management area	Season	Observed pot pulls	No. crab captured in observed pot pulls	No. crab measured
East Central	1997/98			
	1998/99			
	1999/00	182	1,360	1,360
	2000/01	48	561	555
	2001/02	354	3,168	3,014
	2002/03	92	2,380	1,259
	2003/04	328	4,297	3,685
	2004/05			
	2005/06			
	2006/07	303	6,735	4,824
	Mean 1997/98–2003/04	143	1,681	1,410
	2006/07	303	6,735	4,824
Icy Strait	1997/98			
	1998/99			
	1999/00			
	2000/01			
	2001/02			
	2002/03	74	482	482
	2003/04			
	2004/05			
	2005/06			
	2006/07	126	1,170	1,170
	Mean 1997/98–2003/04	11	69	69
	2006/07	126	1,170	1,170

Table 1.– continued (page 2 of 3)

Management area	Season	Observed pot pulls	No. crab captured in observed pot pulls	No. crab measured
Northern	1997-98			
	1998-99			
	1999-00			
	2000-01	110	543	540
	2001-02			
	2002-03			
	2003-04	20	95	95
	2004-05			
	2005-06			
	2006-07	250	1,395	1,263
	Mean 1997/98–2003/04	19	91	91
	2006/07	250	1,395	1,263
Mid Chatham	1997-98			
	1998-99			
	1999-00	124	1,089	1,089
	2000-01	186	1,004	1,004
	2001-02	76	1,189	1,126
	2002-03	69	729	729
	2003-04			
	2004-05			
	2005-06			
	2006-07	99	1,583	1,387
	Mean 1997/98–2003/04	65	573	564
	2006/07	99	1,583	1,387
Lower Chatham	1997-98			
	1998-99			
	1999-00	28	299	279
	2000-01	104	609	609
	2001-02			
	2002-03			
	2003-04'			
	2004-05			
	2005-06			
	2006-07			
	Mean 1997/98–2003/04	19	130	127
	2006/07	0	0	0

Table 1.– continued (page 3 of 3)

Management area	Season	Observed pot pulls	No. crab captured in observed pot pulls	No. crab measured
North Stephens Passage	1997-98			
	1998-99			
	1999-00			
	2000-01			
	2001-02			
	2002-03			
	2003-04			
	2004-05			
	2005-06			
	2006-07	50	463	391
	Mean 1997/98–2003/04	0	0	0
	2006/07	50	463	391
Southern	1997-98	170	1,271	1,271
	1998-99	44	254	254
	1999-00	50	389	389
	2000-01			
	2001-02			
	2002-03			
	2003-04			
	2004-05			
	2005-06			
	2006-07			
	Mean 1997/98–2003/04	38	273	273
	2006/07	0	0	0
All areas	Mean 1997/98–2003/04	42	402	362
	2006/07	118	1,621	1,291
	Total 1997/98–2003/04	2,059	19,719	17,740
	Total 2006/07	828	11,346	9,035

Table 2—Funding summary for pot shrimp stock assessment surveys in Southeast Alaska, 2002-2008.

Fiscal year	Source code	Source type	Funds
2002	11319019	Federal, Nearshore	\$61,700
2003	11311095	F&G fund	\$40,600
	11319019	Federal, Nearshore	\$26,400
2004	11311090	F&G fund	\$2,900
	11311095	F&G fund	\$15,000
	11319039	Federal, Nearshore	\$41,800
2005	11311090	F&G fund	\$7,000
	11311095	F&G fund	\$14,600
2006	11311090	F&G fund	\$9,300
	11311095	F&G fund	\$17,300
2007	11311266	CFEC increment	\$25,000
	11311090	F&G fund	\$28,000
2008	11311266	CFEC increment	\$25,000
	11311090	F&G fund	\$42,561

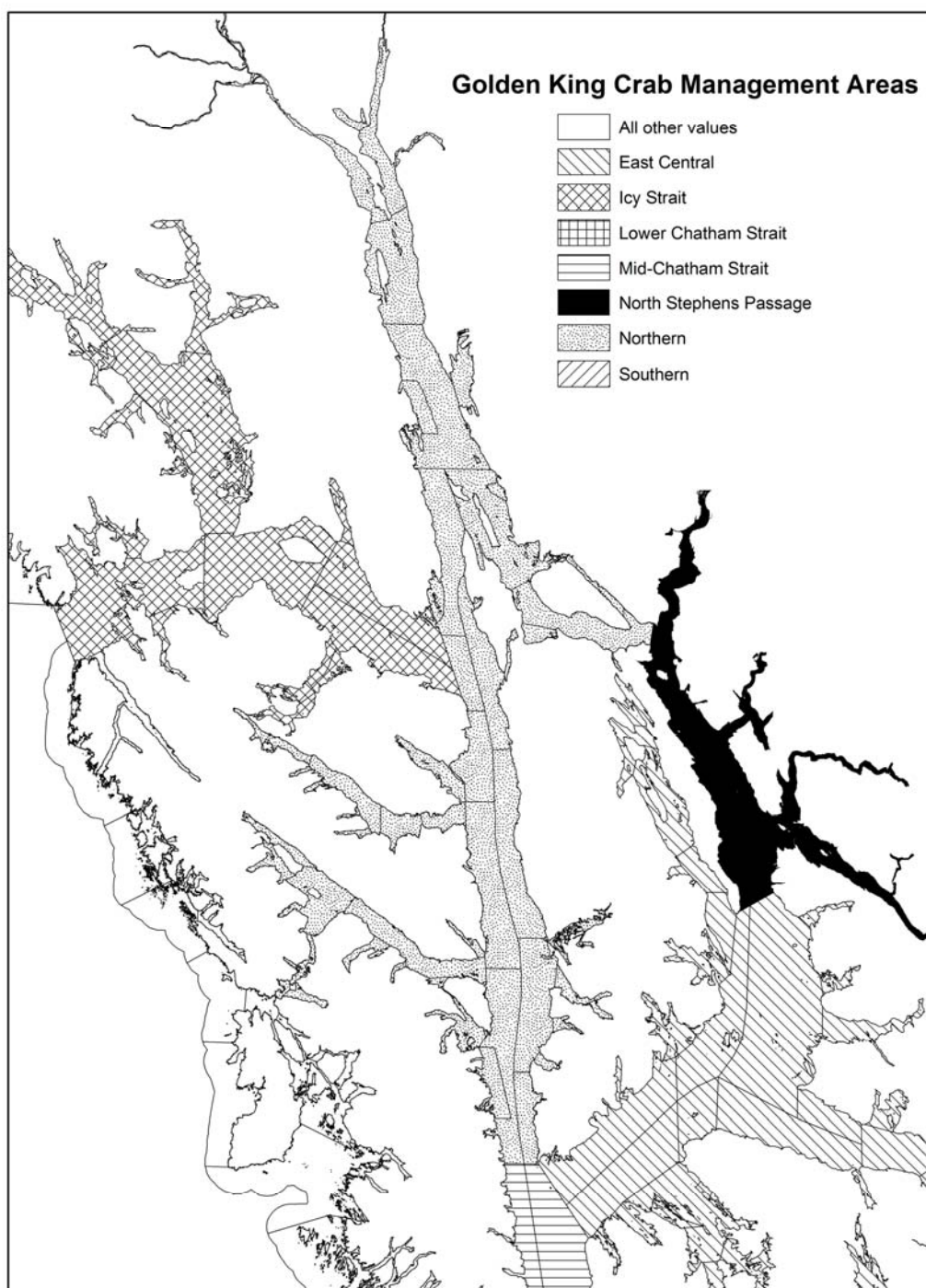


Figure 1.—Golden king crab commercial fishery management areas in Southeast Alaska.

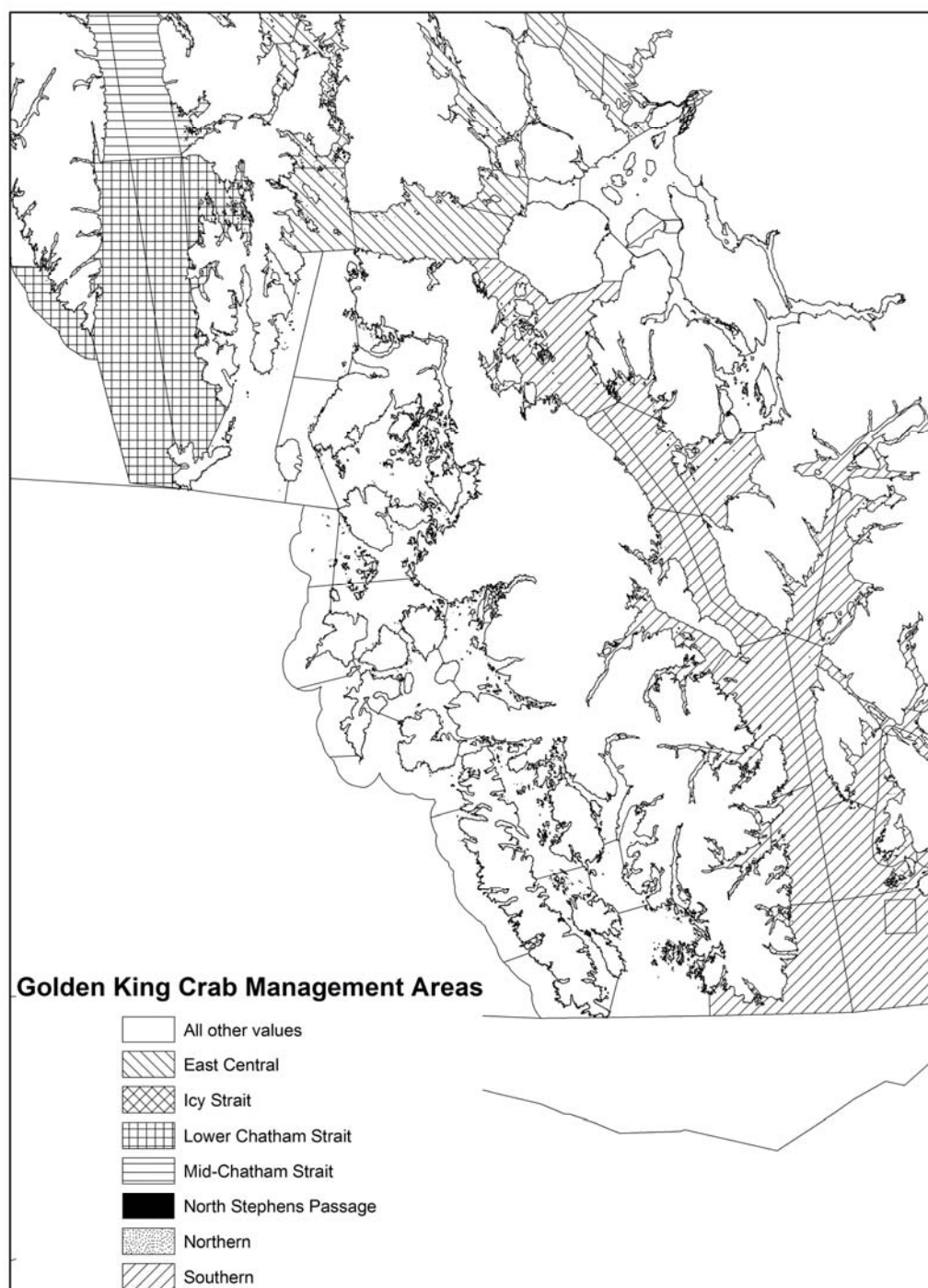


Figure 1.—continued (page 2 of 2)

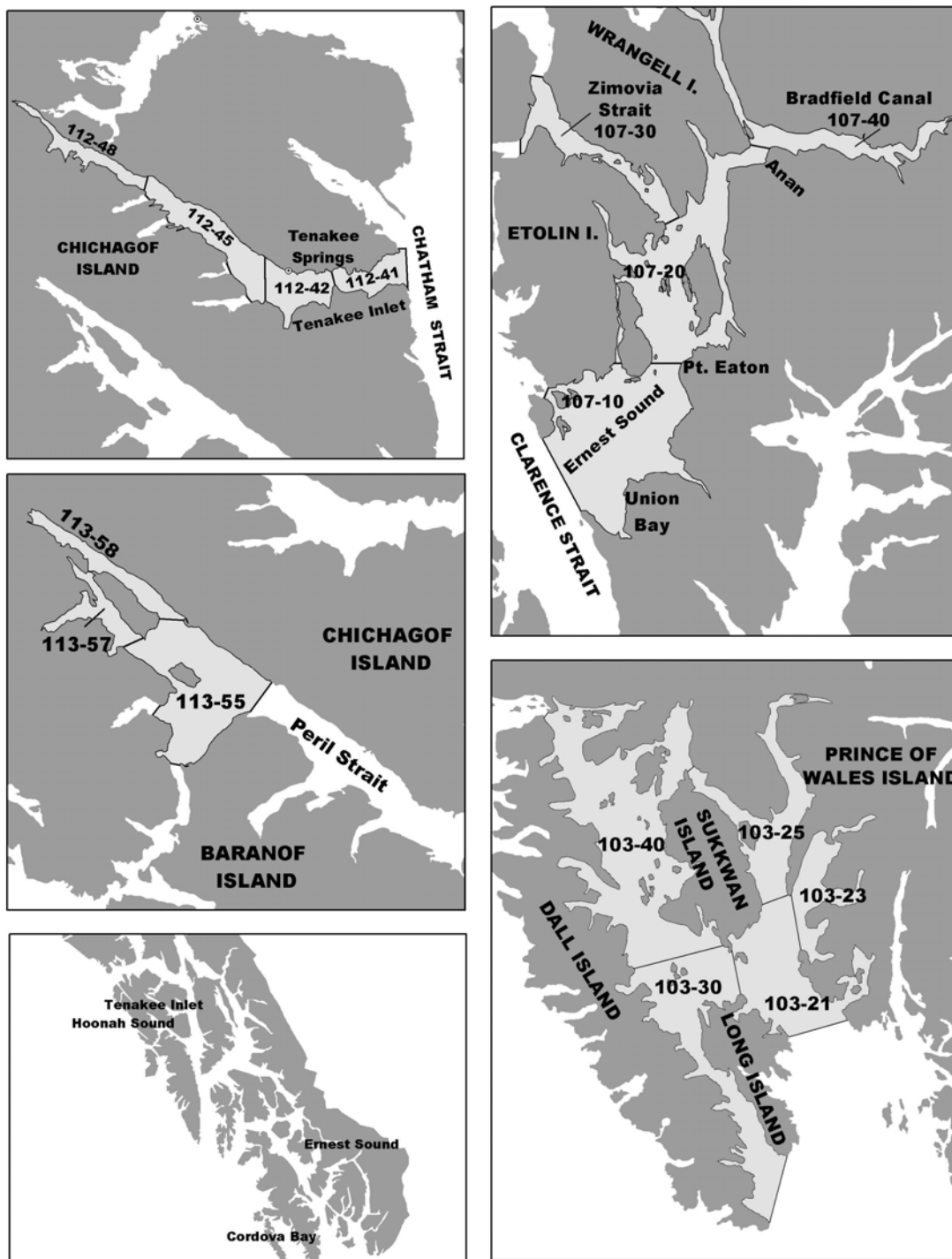


Figure 2.—Pot shrimp stock assessment survey areas in Southeast Alaska.

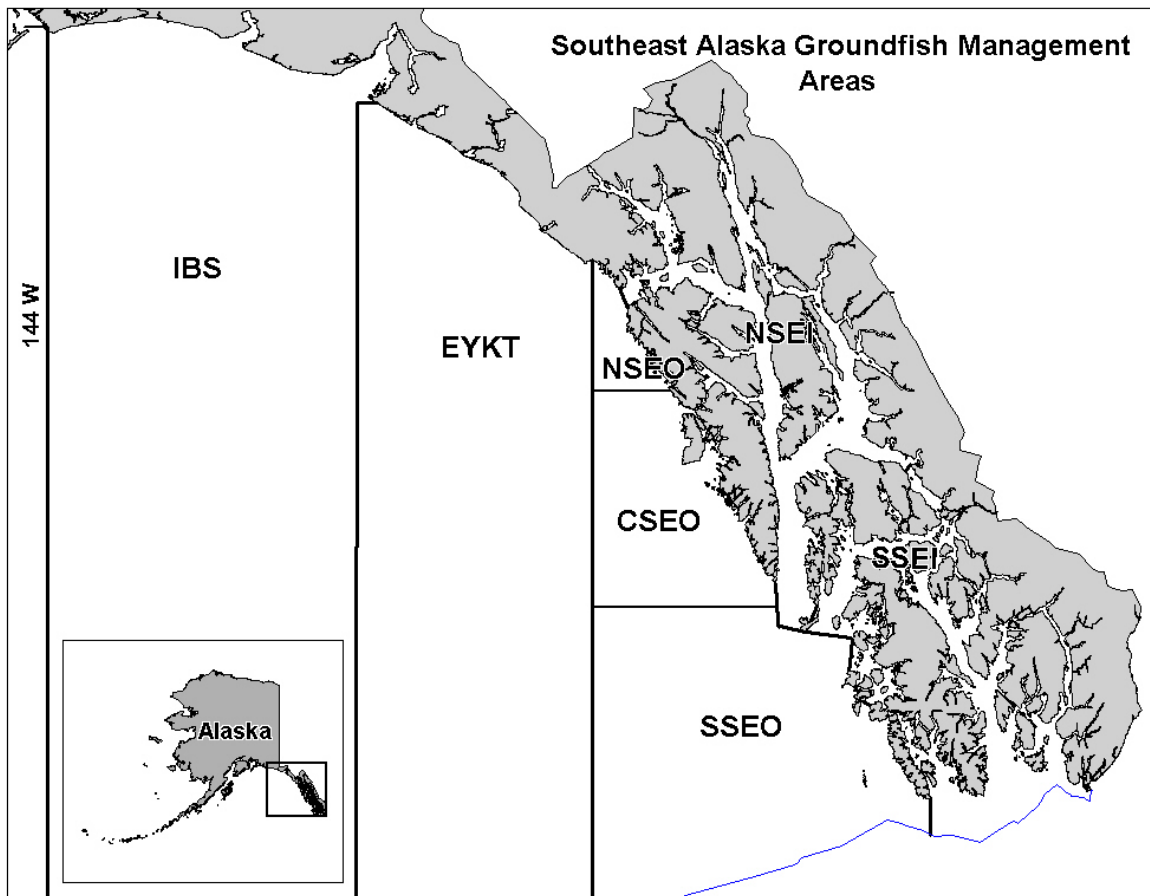


Figure 3.—Groundfish fishery management subdistricts including Northern Southeast Inside (NSEI) and Southern Southeast Inside (SSEI) in Southeast Alaska.

APPENDIX A

Appendix A. 1—Line item allocation and spending plan of FY07 CFEC increment allocated to golden king crab onboard observer program.

Budget FY - 07 SP-
2201 11311266 11311266 GKC Research CFEC

Line Item	100	200	300	400	500	Total
Allocation	\$52,500	\$5,000	\$1,500	\$1,000	\$0	\$60,000

Line 100:

Juneau Research FB I (11-1625) \$42,476

Sea duty for 6-7 survey trips \$15,609

TOTAL \$58,085

Line 200:

Field travel \$1,400

Per diem \$2,500

TOTAL \$3,900

Line 300:

Reimburse commercial vessels for per diem \$1,000

Printing sample forms \$700

TOTAL \$1,700

Line 400:

Sat phone monthly service cost for 2 units \$1,000

Misc. gear/sampling supplies \$1,000

TOTAL \$1,000

Line 500:

TOTAL \$0

Appendix A. 2—Line item allocation and spending plan of FY07 CFEC increment allocated to pot shrimp stock assessment program.

Budget FY - 07	SP- 2201	11311266	11311266	Shrimp Research CFEC		
Line Item	100	200	300	400	500	Total
Allocation	\$0	\$1,000	\$22,000	\$2,000	\$0	\$25,000
Line 100:						
TOTAL						\$0
Line 200:						
staff travel to Wrangell for D7 survey						\$300
staff travel for D13 survey						\$300
staff per diem, D13 survey						\$300
staff travel for D3 survey						\$600
TOTAL						\$1,500
Line 300:						
staff RT charter to Tenakee for D12 survey						\$1,000
staff charter D13 survey						\$1,000
TOTAL						\$2,000
Line 400:						
Medeia food, fuel, stores Pot shrimp Survey D3						\$12,384
Medeia food, fuel, stores Pot shrimp Survey D7						\$7,745
Miscellaneous survey supplies						\$600
D3 & D7 survey bait, 32 cases @\$20/case + chums						\$618
TOTAL						\$21,347
Line 500:						
TOTAL						\$0

Appendix A. 3—Line item allocation and spending plan of FY07 CFEC increment allocated to biometric support projects.

Budget FY - 07	SP- 2201	11311266	11311266	Biometrics Support CFEC		
Line Item	100	200	300	400	500	Total
Allocation	\$0	\$65,000	\$0	\$0	\$0	\$65,000
Line 100:						
TOTAL						\$0
Line 200:						
TOTAL						\$0
Line 300:						
red king crab private contract						\$18,500
University of Alaska Fairbanks MS student collaboration						\$12,700
sablefish program review						\$33,800
TOTAL						\$65,000
Line 400:						
TOTAL						\$0
Line 500:						
TOTAL						\$0